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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/695,992

10/30/2003

Kunihiko Takao

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1800 DIAGONAL ROAD  
SUITE 370  
ALEXANDRIA, VA 22314

EXAMINER

HAMO, PATRICK

ART UNIT

PAPER NUMBER

3746

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/695,992	<b>Applicant(s)</b> TAKAO ET AL.	
	<b>Examiner</b> PATRICK HAMO	<b>Art Unit</b> 3746	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 12 December 2007.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 5-7,9 and 11 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 5-7,9 and 11 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

### **DETAILED ACTION**

This action is in response to amendments filed on December 12, 2007.

#### ***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on December 12, 2007 has been entered.

#### ***Response to Arguments***

Applicant's arguments filed December 12, 2007 have been fully considered but they are not persuasive. A rejection under 35 U.S.C. 112 had not previously been made, but the nature of the interview conducted on December 6, 2007 was primarily focused on the limitation that "a flow rate of the liquid discharged from the upstream-side plunger pump [is] greater than a flow rate of the liquid stored in the downstream-side plunger pump." Applicant adequately addressed the first point as to whether or not the two flow rates should be the same. However, in regard to the second point, namely how stored liquid can have a flow rate, the examiner still finds the limitation unclear in view of the explanation provided. Please see the rejection below for further details.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 5-7, 9 and 11 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 11, from which all other claims depend, includes the limitation that "a flow rate of the liquid discharged from the upstream-side plunger pump [is] greater than a flow rate of the liquid stored in the downstream-side plunger pump." In the interview conducted on December 6, 2007 with the applicant's attorney the lack of clarity of this limitation was discussed. This stems primarily from the fact that the concept of "flow rate" of a stored liquid is unclear, because "flow rate" applies to a fluid that is measurably being displaced from one location to another, as understood by the examiner. The characterization made previously by the examiner that "stored" liquid is stationary admittedly does not apply to the present invention, as the fluid is disturbed and caused to move by the intake stroke of the downstream-side plunger pump. However, it is unclear whether the intake stroke would result in a "flow" of the stored liquid, as is implied in claim 11 when a "flow rate" of the stored liquid is being compared to the flow rate of the discharge liquid of the upstream-side pump. Because the stored liquid remains within the chamber of the upstream-side plunger pump, it is not clear in what manner it "flows" nor how one would be able to measure its flow "rate". As far as

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the claimed limitation, it does not require a measurement to be taken of the flow rate of the stored liquid, but there has to be a reasonable method to be able to measure it and compare it to a flow rate of the discharged liquid to demonstrate that the flow rate of the stored liquid is in fact less than the flow rate of the discharged liquid. The examiner does not know of any such method. The nature of the flow of the stored liquid is fundamentally different from a flow achieved when fluid is being discharged from one plunger chamber to another, and its unclear how the two flow rates can be compared, as far as the examiner understands.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 5-6 and 11 are rejected under 35 U.S.C. 102(b) as being anticipated by Bez, Pat. No. 5,482,443.

Bez discloses a pump including a pump cylinder 53 having an inner wall surface 70 and a piston 42 reciprocating in the cylinder, the piston being formed on its outer surface with a stepped part 74 along the driving direction of the piston so as to define a working chamber having a cross-sectional area between the stepped part 74 and the inner wall surface 70 of the cylinder (stage 3, fig. 4). It is inherent that its

cross-sectional area and the driving speed of the piston determine the flow rate out of this working chamber. The pump includes another pump cylinder 51 with a piston 72 reciprocating in it, a suction valve 100 with a one-way check valve 103 upstream of this pump cylinder, the one-way being directed from the upstream into the upstream-side pumping chamber, therefore preventing flow when the piston moves forward to pressurize the liquid in the chamber, and allowing flow when the piston moves backward to draw liquid into the chamber, and a discharge valve 55 with one-way valve 108 downstream of the first pump cylinder but upstream of the second (see fig. 6), the one-way being directed from the upstream side chamber towards the downstream side chamber such that it prevents flow when the upstream piston moves backward and allowing flow when it moves forward. Pump cylinder 53 is located farthest downstream of three pumps provided. The working chamber of pump cylinder 53 is connected to a discharge passage 142 out of the pumping assembly and the working chamber of pump cylinder 51 is connected to an intake or suction passage 92, and pump cylinders 51 and 53 are connected in series (stages 1 and 3, fig. 10).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 7 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sugiyama et al., 6,122,049 in view of Bez, 5,482,443, and further in view of Gerhardt et al., 6,712,587.

Sugiyama teaches a liquid chromatographic apparatus including a reservoir 10, 12, 62, a low pressure pump 20, 22 provided between the reservoir and a pump 34 for providing eluent to a column 42, a switch valve 38, a passage communicating the switch valve 38 to the column 42 and a passage communicating to reservoir 62 (fig. 1), the switch valve changing over communication between the two passages.

However, Sugiyama does not teach the following taught by Bez: a pump including a pump cylinder 53 having an inner wall surface 70 and a piston 42 reciprocating in the cylinder, the piston being formed on its outer surface with a stepped part 74 along the driving direction of the piston so as to define a working chamber having a cross-sectional area between the stepped part 74 and the inner wall surface 70 of the cylinder (stage 3, fig. 4), and the end part of the piston 42 on the side remote from the drive side exposed to a gas atmosphere via chambers 46 and 48, as seen in fig. 1 (col. 4, ll. 60-67). It is inherent that its cross-sectional area and the driving speed of the piston determine the flow rate out of this working chamber. The pump includes another pump cylinder 51 with a piston 72 reciprocating in it, a suction valve 100 with a one-way check valve 103 upstream of this pump cylinder, the one-way being directed from the upstream into the upstream-side pumping chamber, therefore preventing flow when the piston moves forward to pressurize the liquid in the chamber, and allowing

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flow when the piston moves backward to draw liquid into the chamber, and a discharge valve 55 with one-way valve 108 downstream of the first pump cylinder but upstream of the second (see fig. 6), the one-way being directed from the upstream side chamber towards the downstream side chamber such that it prevents flow when the upstream piston moves backward and allowing flow when it moves forward. Pump cylinder 53 is located farthest downstream of three pumps provided. The working chamber of pump cylinder 53 is connected to a discharge passage 142 out of the pumping assembly and the working chamber of pump cylinder 51 is connected to an intake or suction passage 92, and pump cylinders 51 and 53 are connected in series (stages 1 and 3, fig. 10).

Furthermore, neither Sugiyama nor Bez teach the following taught by Gerhardt: a pump for liquid chromatography wherein a liquid flow rate is in the  $\mu\text{L}/\text{min}$  range, particularly 1  $\mu\text{L}/\text{min}$  or less (col. 1, ll. 57-60) that is reliable and uses off-the-shelf technology (col. 2, ll. 4-12).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to have modified Sugiyama with Bez and Gerhardt in order to prevent leakage of atmospheric pressure air into the working parts of the pump (Bez, col. 2, ll. 44-56) and make it more reliable and use off-the-shelf technology (Gerhardt, col. 2, ll. 4-12).

Furthermore, the claimed ranges of 0.1 nL/min to 50  $\mu\text{L}/\text{min}$  overlaps the range taught by Gerhardt and therefore fails to patentably distinguish over the prior art. See MPEP §2144.05(1).



***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to PATRICK HAMO whose telephone number is (571)272-3492. The examiner can normally be reached on M-F 8:30-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Devon Kramer can be reached on 571-272-7118. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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